

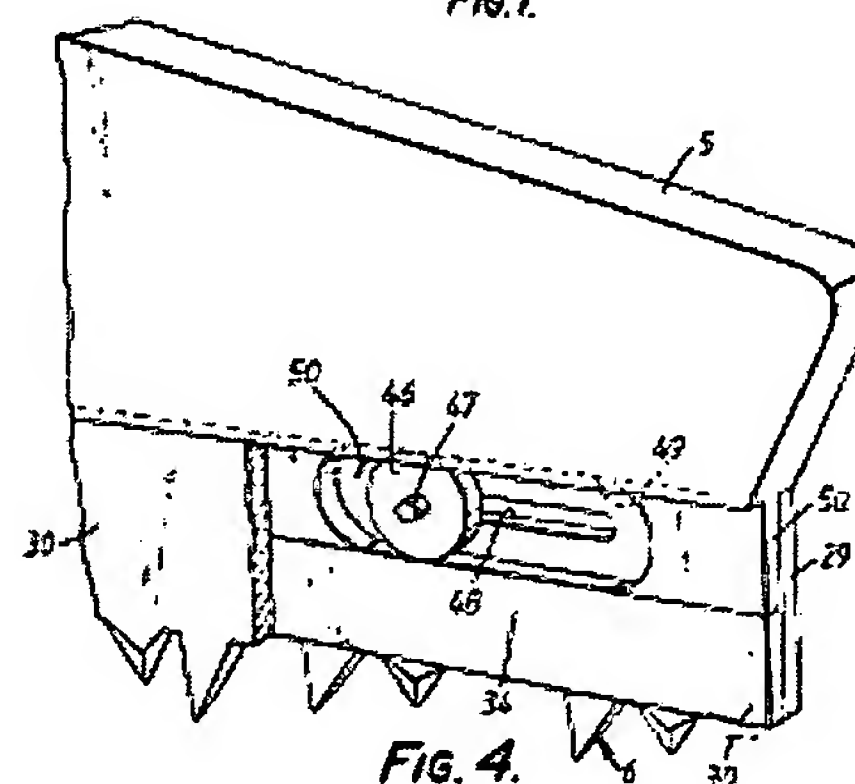
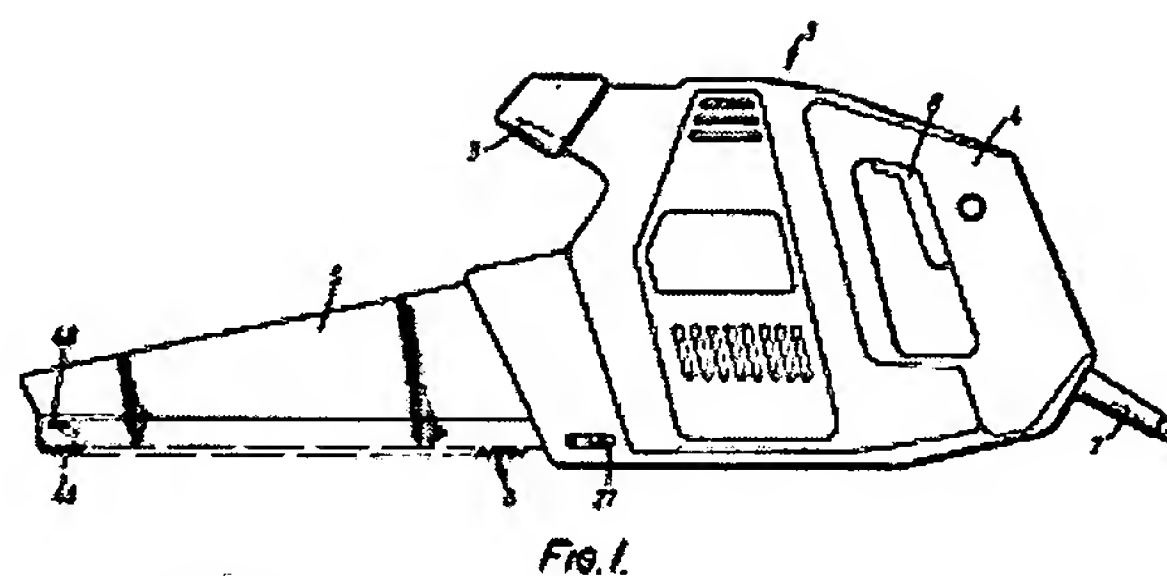
Improvements in and relating to power saws

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Applicant: BLACK & DECKER INC
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- european: B23D49/16B; B23D51/02G; B23D51/16
Application number: GB19850023853 19850927
Priority number(s): GB19850023853 19850927

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Abstract of GB2180791

A hand-held power saw includes a housing (1) accommodating a drive motor (2) and a drive mechanism for reciprocating a saw blade (6) along the lower edge of a tapering saw blade support (5) that extends from the housing (1). The drive mechanism includes a counterbalance device for counterbalancing linear out-of-balance faces created during use by the saw blade and its drive mechanism. An additional bearing means (46) for the saw blade is located in the tapering support (5).



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(56) Documents Cited
EP 1010497 A1
The Axminster Power Tool Centre Tool Catalogue
1996-1997, pages 216 and 217.

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Other: Online: WPI, EPODOC, JAPIO

(54) Abstract Title
Hand-held powered combined reciprocating saw and jigsaw

(57) A hand-held powered combined reciprocating saw and jigsaw comprises a main body 3 having a first longitudinal edge 9 extending between front and rear ends 5, 7, and an elongate saw blade 11 extending from the front end generally adjacent the first longitudinal edge and arranged to carry out a reciprocating sawing motion. The saw includes a first handle 13 located generally at the rear end of the main body and oriented substantially perpendicular to a cutting edge 15 of the saw blade. The first handle has a predetermined length L, and the distance D between the first handle and the front end of the main body is no greater than three, but more preferably no greater than two, times the length of the handle. Preferably the saw comprises a second handle 17 inclined to the cutting edge of the saw blade and located closer to the front end of the main body. The saw may be cordless, and may include a guard 25 extending substantially perpendicular to the cutting edge.

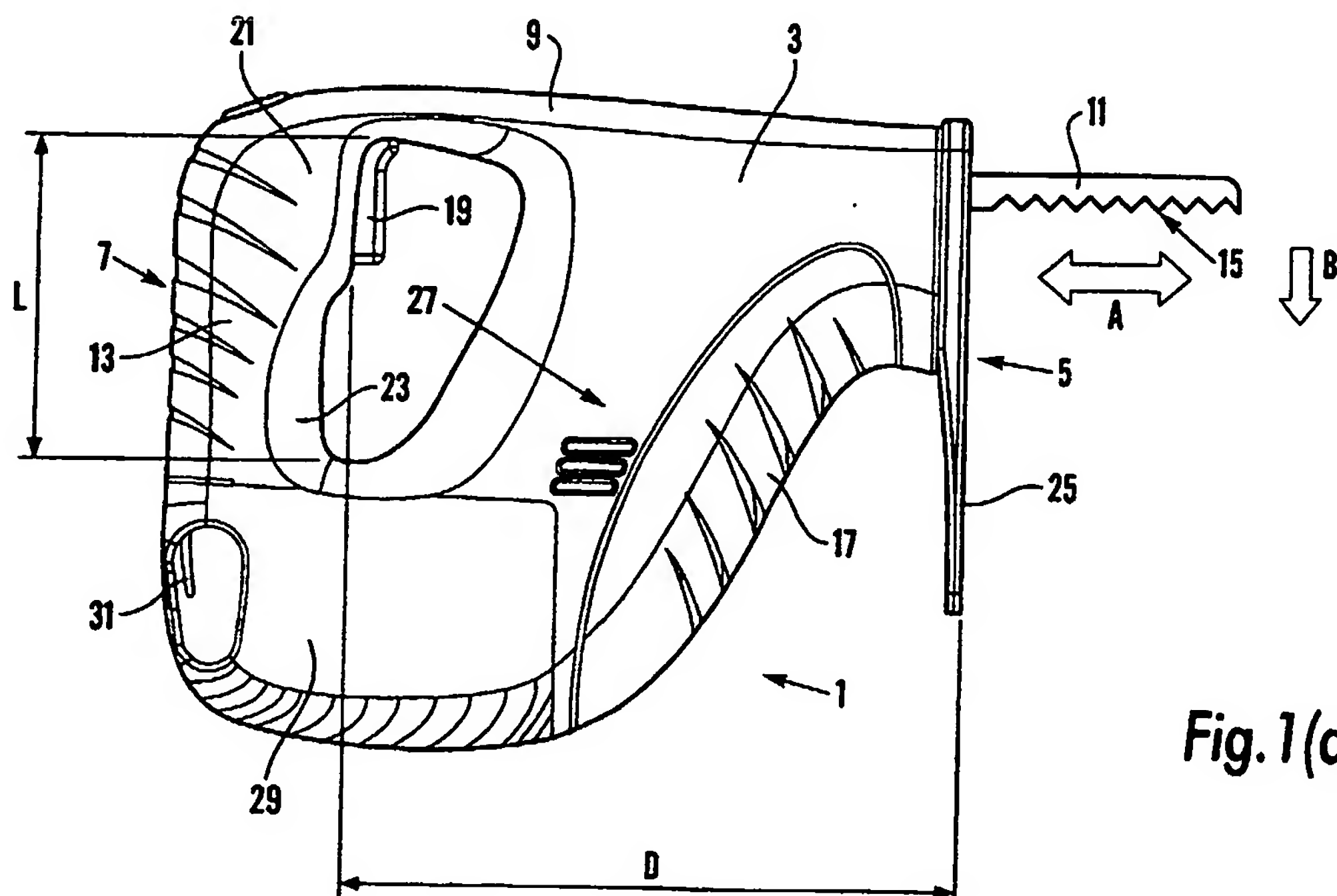
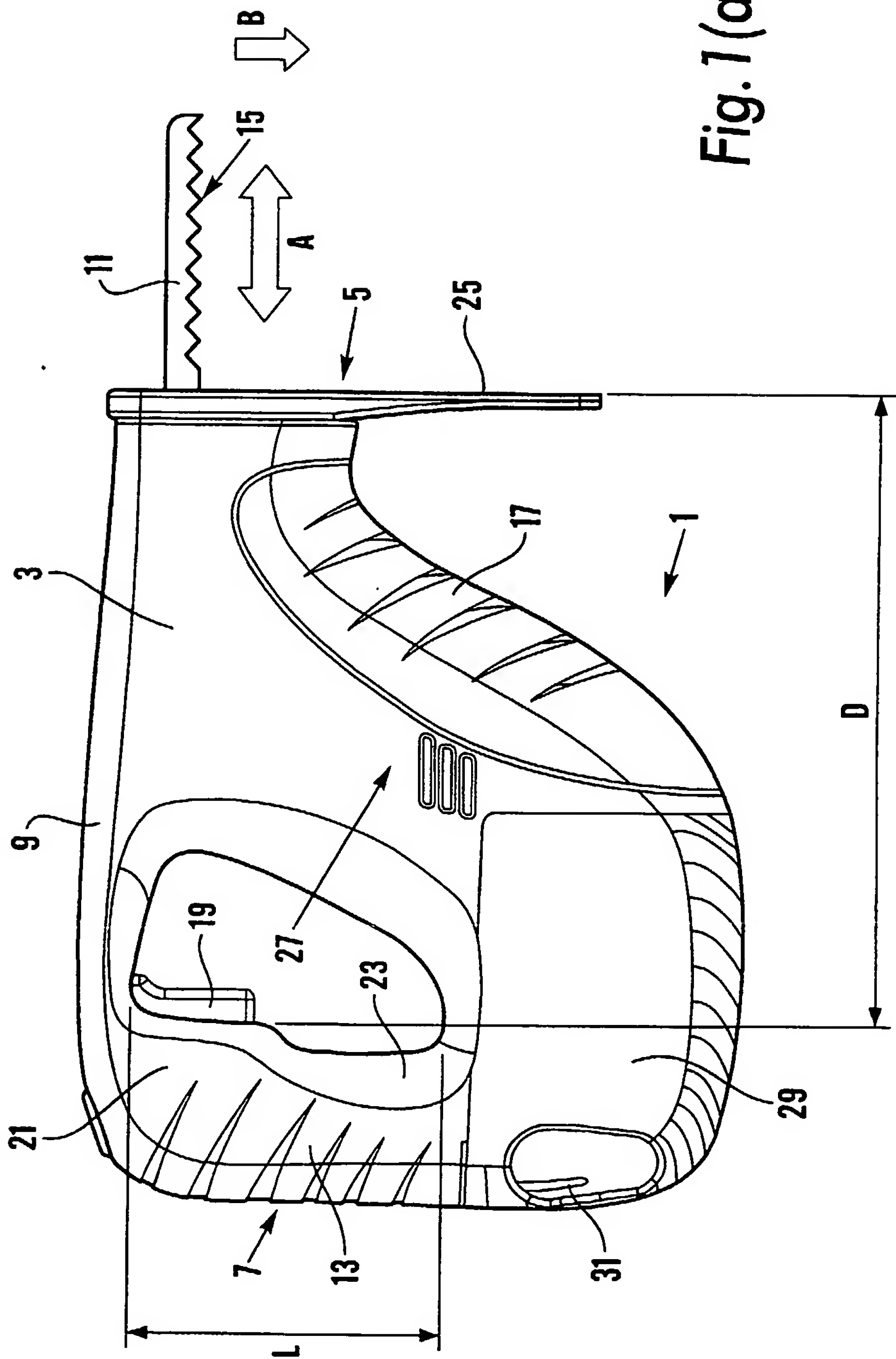


Fig. 1(a)



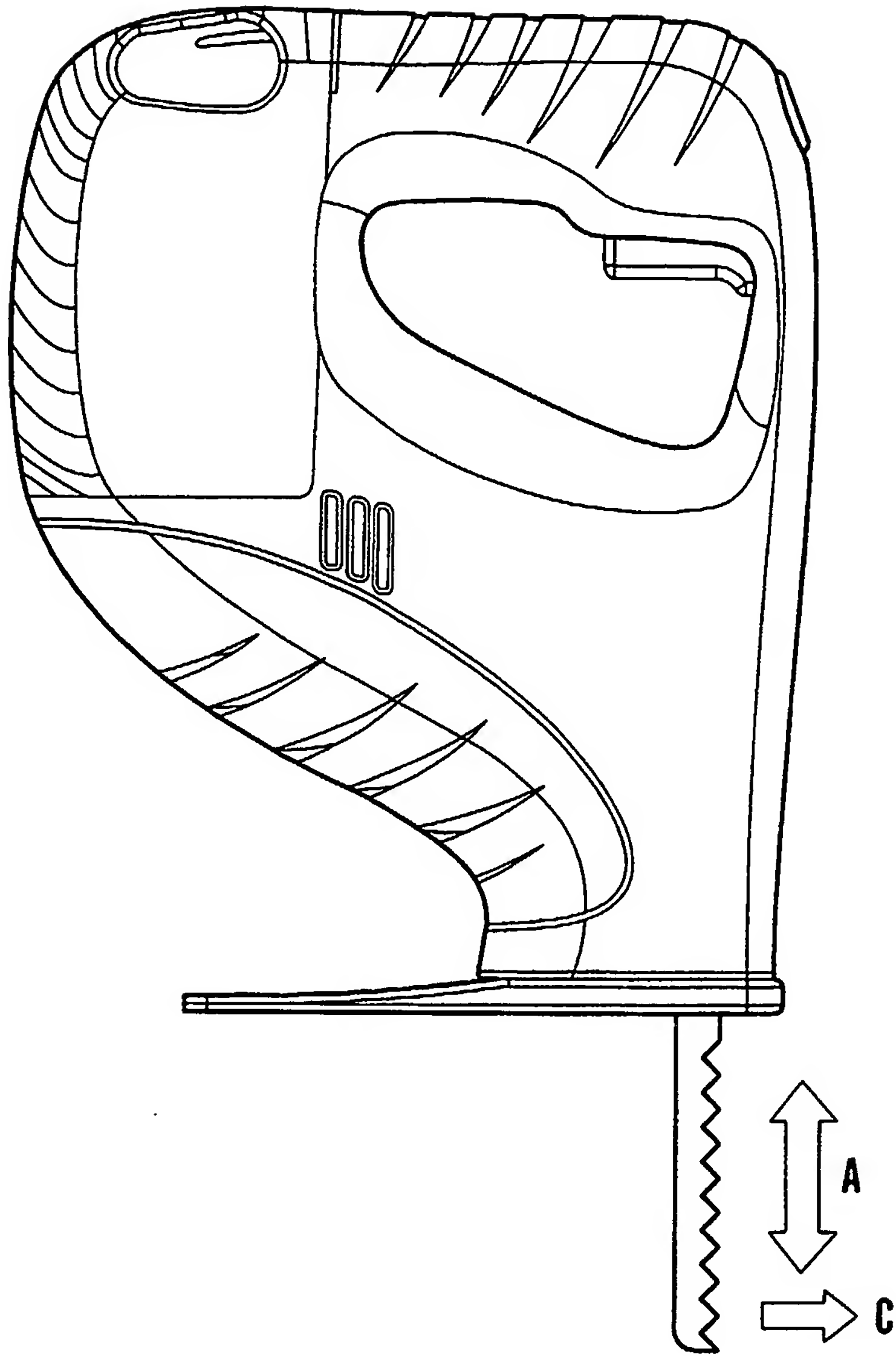


Fig. 1(b)

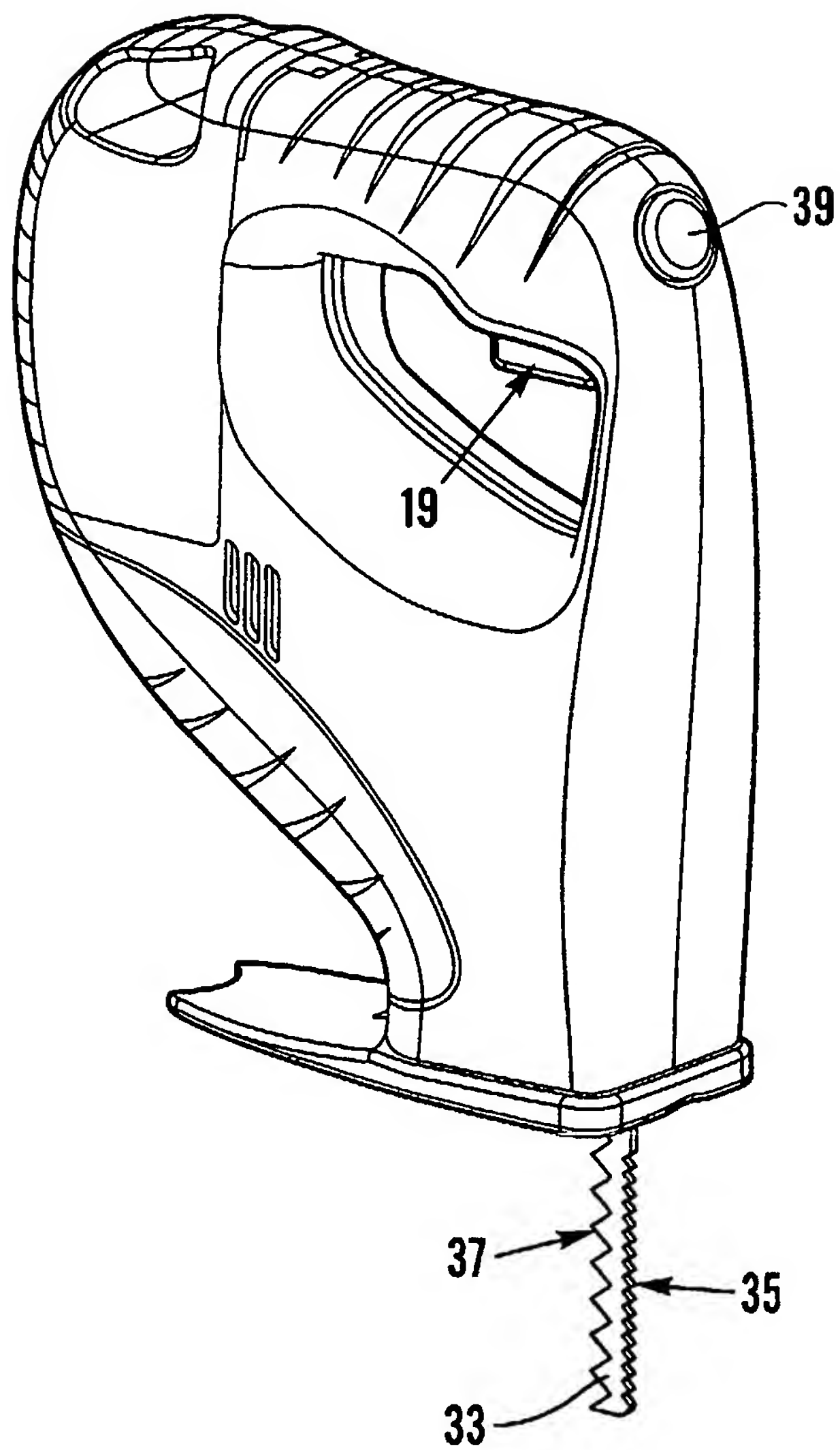


Fig.2

Fig. 3(a)

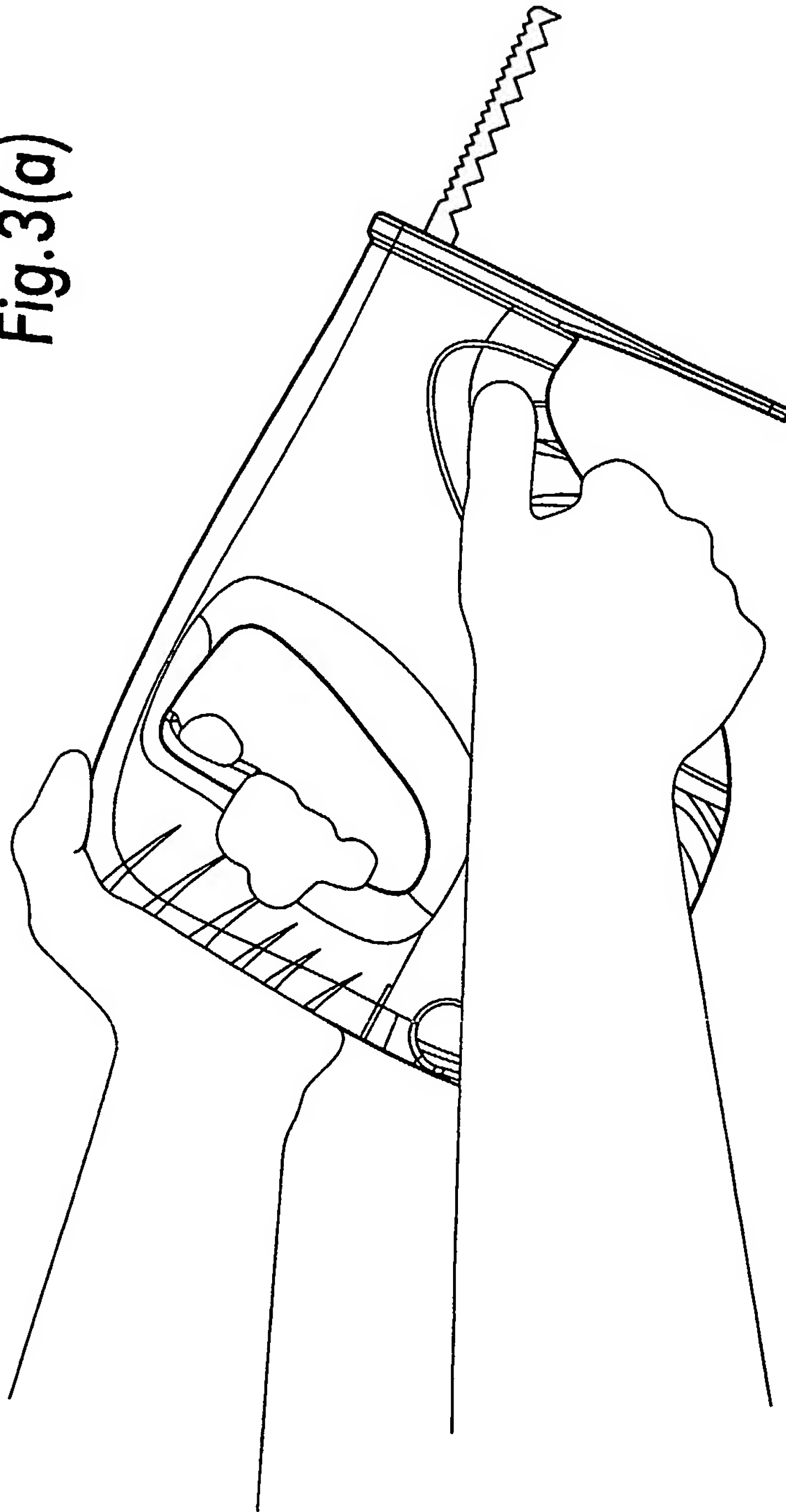
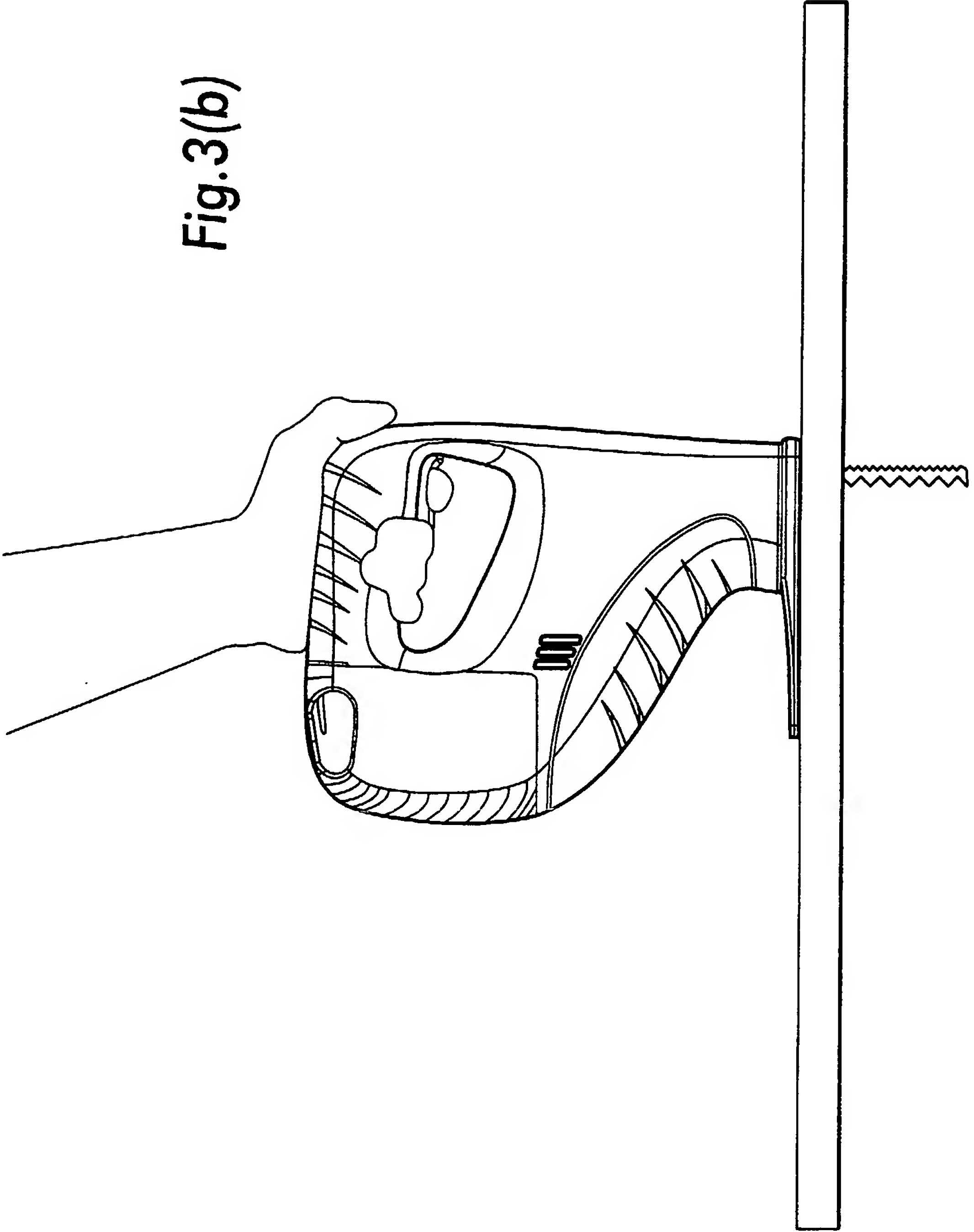


Fig. 3(b)



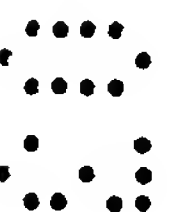
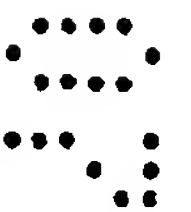
Hand-held Saw

The present invention relates to hand-held powered saws, and in particular relates to jigsaws and so-called reciprocating saws.

Reciprocating saws are powered hand-held saws in which the saw blade is normally used in a generally horizontal orientation (or slightly inclined to the horizontal), with the cutting edge of the saw blade oriented downwardly. The saw blade undergoes a reciprocating sawing motion in a longitudinal direction (i.e. along the length of the saw blade) in order to cut through workpieces normally in a generally downwards direction which mimics the action of a manual saw.

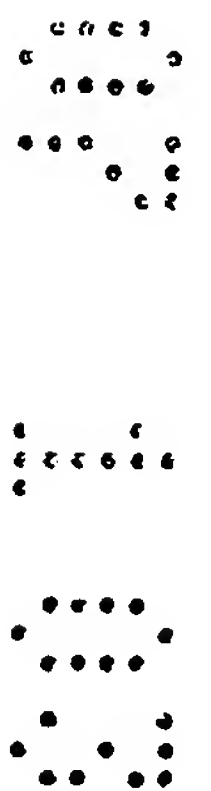
Powered jigsaws are hand-held saws in which the saw blade normally is used in a generally vertical orientation with the cutting edge of the saw blade oriented forwardly, away from the user. The saw blade undergoes a reciprocating sawing motion in a longitudinal direction (i.e. along the length of the saw blade) in order to cut through workpieces normally in a generally horizontal direction.

Although both of these types of powered saw use a reciprocating sawing motion, their similarity is restricted to this feature. Reciprocating saws have a generally elongate construction with a handle (including a finger controlled actuation trigger) at a rear end of the saw opposite the front end of the saw which carries the saw blade. The motor for the saw blade is normally located in a longitudinal section of the saw between the rear handle and the saw blade. Jigsaws, on the other hand, generally have more of a square (in side view) construction, with a vertically oriented section carrying the vertically oriented saw blade, a handle (including a trigger controlled actuation trigger) at the top of the saw arranged inclined to the horizontal in an upwards and forwards



orientation, and the motor for the saw blade arranged generally below the handle.

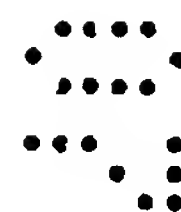
Reciprocating saws and jigsaws have entirely different designs and modes of use. However, a saw product marketed by the Black & Decker company in the UK under the trade name "Scorpion" is an attempt to provide a saw which can be used both as a reciprocating saw and as a jigsaw. A problem associated with attempting to produce a saw which can be used in both of these ways is that the rear handle of a reciprocating saw is generally oriented substantially vertically in use (and perpendicular to the longitudinal axis of the saw) whereas the handle of a jigsaw is generally oriented substantially horizontally in use. The solution to this problem proposed by the Black & Decker Scorpion product is to have a handle oriented at approximately 45° to the cutting edge of the saw blade so that the saw may be used generally horizontally as a reciprocating saw, or vertically as a jigsaw. The finger controlled actuation trigger of the handle is located in the middle of the handle (rather than at one end to be actuated by the index finger, as is conventional) because the handle is grasped in opposite orientations when the saw is used, respectively, as a reciprocating saw and a jigsaw.



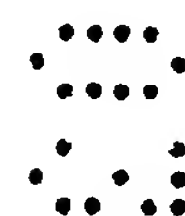
This solution to the problem of attempting to combine a reciprocating saw and a jigsaw in one saw is therefore a compromise. In each mode of use, the handle, while usable, is arranged in a less than ideal orientation, and the actuation control trigger is located in the middle of the handle rather than being conveniently located adjacent to the end of the handle grasped by the index finger. This latter compromise is a particularly serious disadvantage, since it necessitates the user either to control the actuation of the saw by one or more fingers other than the index finger (which inherently provide less sensitive control than the index finger) or it necessitates the user artificially to position his hand at one end of the handle so that his index finger may control the trigger, such a hand position itself decreasing the degree of control the user has over the saw.

Accordingly, the present invention seeks to provide a powered hand-held saw which may be used both as a reciprocating saw and as a jigsaw, but which overcomes the above problems and disadvantages.

According to a first aspect, the invention provides a hand-held powered combined reciprocating saw and jigsaw, comprising a main body having a front end, a rear end, a first longitudinal edge extending between the front and rear ends, and, at least in use, an elongate saw blade extending from the front end generally adjacent to the first longitudinal edge and arranged to carry out a reciprocating sawing motion, the saw including a first handle located generally at the rear end of the main body and oriented substantially perpendicular to the cutting edge of the saw blade, the first handle having a predetermined length, and the distance between the first handle and the front end of the main body being no greater than three times the length of the handle.



Preferably the distance between the first handle and the front end of the main body is no greater than two and a half times, more preferably no greater than twice, the length of the handle.

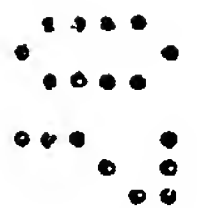


According to a second aspect, the invention provides a hand-held powered combined reciprocating saw and jigsaw, comprising a main body having a front end, a rear end, a first longitudinal edge extending between the front and rear ends, and, at least in use, an elongate saw blade extending from the front end generally adjacent to the first longitudinal edge and arranged to carry out a reciprocating sawing motion, the saw including a first handle located generally at the rear end of the main body and oriented substantially perpendicular to the cutting edge of the saw blade, the saw including a second handle inclined to the cutting edge of the saw blade and located closer to the front end of the main body than is the first handle.

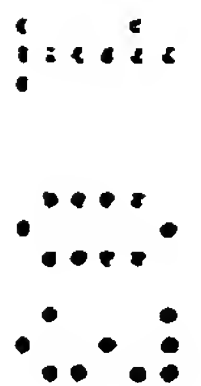
With regard to the second handle being inclined to the cutting edge of the saw blade, this includes the possibility of the second handle being oriented substantially perpendicular to the cutting edge of the saw blade.

Preferably the features of the first aspect of the invention are combined with the features of the second aspect of the invention.

In preferred embodiment of the invention the first handle includes saw actuation control means. Preferably the saw actuation control means comprises an actuation control trigger (which term encompasses control buttons, levers, and the like). Most preferably, the saw actuation control means is located generally adjacent to a first end of the first handle which is the closer of two opposite ends of the handle to the first longitudinal edge of the main body.



The saw according to either aspect of the invention may be used as a reciprocating saw with the saw blade and first longitudinal edge of the main body oriented generally horizontally, and the cutting edge of the saw blade oriented generally horizontally and downwardly. Additionally, the saw according to either aspect of the invention may be used as a jigsaw with the saw blade and first longitudinal edge of the main body oriented generally vertically, and the cutting edge of the saw blade oriented generally vertically and forwardly.



It will be appreciated that in order to convert between reciprocating and jigsaw modes, the orientation of the cutting edge of the saw blade needs to change. In reciprocating saw mode the cutting edge is oriented away from the first longitudinal edge of the main body, whereas in jigsaw mode the cutting edge is oriented towards the first longitudinal edge of the main body. This may be achieved in one of two ways. The saw blade may be re-orientable with respect to the main body (i.e. it may be turned through 180° about its longitudinal axis) and/or the saw blade may comprise two cutting edges, provided on opposite edges of the saw blade.

The saw according to the invention achieves the ability to be used as both a reciprocating saw and as a jigsaw for a variety of reasons. Firstly, the fact that the first handle is oriented substantially perpendicular to the cutting edge of the saw blade means that the saw is suitable for use both generally horizontally and vertically. This is in contrast to conventional jigsaws in which, because the handle is arranged inclined to the horizontal in a forwards and upwards direction, the saw is unsuitable for use in an orientation 90° from its normal orientation with the saw blade generally horizontal rather than generally vertical. This is because in such a horizontal (i.e. reciprocating) mode, the handle of a conventional jigsaw would be inclined rearwardly and upwardly and hence would be completely unsuitable for controlled use – reciprocating saws normally have their handle inclined forwardly and upwardly (which provides comfort and control to the user). Conversely, this feature of conventional reciprocating saws makes them unsuitable for use as jigsaws since in this mode their handle would be inclined rearwardly and upwardly (rather than forwardly and upwardly as in conventional jigsaws).

Secondly, because, according to the first aspect of the invention, the distance between the first handle and the front end of the main body of the saw is no greater than three times the length of the handle, the saw provides a high degree of controllability in jigsaw mode. In contrast, in conventional reciprocating saws the distance between the rear handle and the front end of the saw body is generally much greater than three times the length of the handle, rendering such saws entirely unsuitable for an attempt to be made to use them as jigsaws, because there would be insufficient control over the saw due to the large distance between the handle and the saw blade.

Thirdly, according to the second aspect of the invention the saw includes a second handle inclined (which term includes the possibility of the handle being perpendicular) to the cutting edge of the saw blade and located closer to the front end of the main body than is the first handle. This has the advantage

of enabling a compact (and, in particular, short in length) saw which, because it has two handles is safe and convenient in reciprocating saw mode and which, because it is compact is safe and convenient in jigsaw mode.

Further preferred and optional features of the invention will be described below.

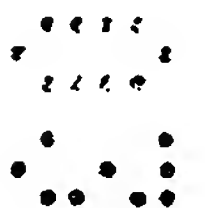
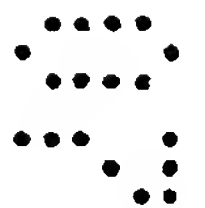
The invention will now be described, by way of example, with reference to the accompanying drawings, of which:

Figure 1 (views (a) and (b)) shows an embodiment of a saw according to the invention in both reciprocating and jigsaw modes;

Figure 2 shows a second embodiment of a saw according to the invention in jigsaw mode; and

Figure 3 (views (a) and (b)) shows the second embodiment being used in both reciprocating and jigsaw modes.

Figure 1(a) shows a hand-held powered saw 1 according to the invention, comprising a main body 3 having a front end 5, a rear end 7, a first longitudinal edge 9 extending between the front and rear ends, and an elongate saw blade 11 extending from the front end generally adjacent to the first longitudinal edge and arranged to carry out a reciprocating sawing motion as indicated by arrow A. The saw 1 includes a first handle 13 located generally at the rear end of the main body and oriented substantially perpendicular to the toothed cutting edge 15 of the saw blade. The cutting edge 15 of the saw blade is oriented substantially horizontally and facing downwardly as indicated by arrow B.



The first handle 13 has a predetermined length L, and the distance D between the first handle and the front end of the main body is no greater than $3 \times L$.

Additionally, the saw 1 includes a second handle 17 inclined to the cutting edge 15 of the saw blade 11 and located closer to the front end of the main body 3 than is the first handle 13.

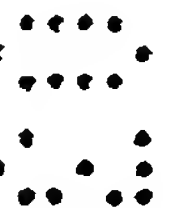
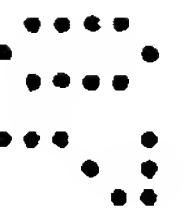
The first handle 13 includes a saw actuation control means in the form of an actuation control trigger 19 which is located generally adjacent to a first end 21 of the first handle which is the closer of two opposite ends 21 and 23 of the handle to the first longitudinal edge 9 of the main body 3.

The front end 5 of the main body 3 of the saw 1 includes a guard 25 extending substantially perpendicular to the cutting edge 15 of the saw blade 11. The guard extends generally adjacent to the second handle 17 to protect the user's hand while holding this handle in reciprocating saw mode.

The main body 3 of the saw 1 is formed from a plastics material. It contains an electric motor (not shown but located as generally indicated by reference numeral 27 between the first and second handles).

This embodiment of the invention is a cordless saw – i.e. it is provided with its own power source – a battery pack 29. The battery pack 29 is removable from the main body by means of trigger 31 (for example for recharging). The battery pack 29 and trigger 31 are the subject of a co-pending and co-owned patent application.

Figure 1(b) shows the saw 1 of Figure 1(a) rotated through 90° for use in jigsaw mode. In this orientation the cutting edge 15 of the saw blade 11 is oriented substantially vertically. The saw blade 11 has been turned through 180° so that its cutting edge faces forwardly as indicated by arrow C.

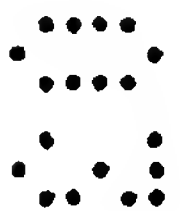
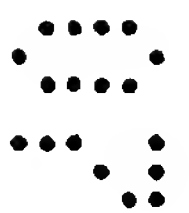


Because the first handle 13 is arranged substantially perpendicular to the cutting edge 15 of the saw blade, and because the actuation control trigger 19 is located adjacent to the first end 21 of the first handle which is itself adjacent to the first longitudinal edge 9 (and the saw blade is adjacent to edge 9), the saw is safely and conveniently usable in both reciprocating and jigsaw modes, as shown.

Figure 2 is a perspective view of the saw of Figure 1 in jigsaw mode. In this embodiment, however, the saw blade 33 has two toothed cutting edges 35 and 37, so that the blade does not need to be turned through 180° in order to convert the saw between reciprocating and jigsaw modes.

Also shown in Figure 2 is a safety button 39 which needs to be depressed before the squeezing of trigger 19 actuates the saw.

Figure 3(a) illustrates the use of the saw of Figure 2 in reciprocating mode, and Figure 3(b) illustrates the use of the same saw in jigsaw mode.



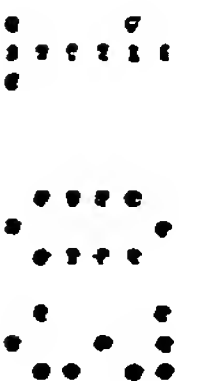
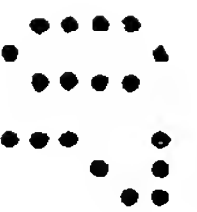
Claims

1. A hand-held powered combined reciprocating saw and jigsaw, comprising a main body having a front end, a rear end, a first longitudinal edge extending between the front and rear ends, and, at least in use, an elongate saw blade extending from the front end generally adjacent to the first longitudinal edge and arranged to carry out a reciprocating sawing motion, the saw including a first handle located generally at the rear end of the main body and oriented substantially perpendicular to the cutting edge of the saw blade, the first handle having a predetermined length, and the distance between the first handle and the front end of the main body being no greater than three times the length of the handle.
2. A saw according to Claim 1, in which the distance between the first handle and the front end of the main body is no greater than two and a half times the length of the handle.
3. A saw according to Claim 1 or Claim 2, in which the distance between the first handle and the front end of the main body is no greater than twice the length of the handle.
4. A saw according to any preceding claim, which further comprises a second handle inclined to the cutting edge of the saw blade and located closer to the front end of the main body than is the first handle.
5. A hand-held powered combined reciprocating saw and jigsaw, comprising a main body having a front end, a rear end, a first longitudinal edge extending between the front and rear ends, and, at least in use, an elongate saw blade extending from the front end generally adjacent to the first longitudinal edge and arranged to carry out a reciprocating sawing motion, the saw including a first handle located generally at the rear end of the main body and oriented substantially perpendicular to the

cutting edge of the saw blade, the saw including a second handle inclined to the cutting edge of the saw blade and located closer to the front end of the main body than is the first handle.

6. A saw according to Claim 4 or Claim 5, in which the second handle is oriented substantially perpendicular to the cutting edge of the saw blade.
7. A saw according to any preceding claim, in which the first handle includes saw actuation control means.
8. A saw according to Claim 7, in which the saw actuation control means comprises an actuation control trigger.
9. A saw according to Claim 7 or Claim 8, in which the saw actuation control means is located generally adjacent to a first end of the first handle which is the closer of two opposite ends of the handle to the first longitudinal edge of the main body.
10. A saw according to any preceding claim, in which, during use in reciprocating saw mode the cutting edge of the saw blade is oriented away from the first longitudinal edge of the main body, whereas during use in jigsaw mode the cutting edge of the saw blade is oriented towards the first longitudinal edge of the main body.
11. A saw according to Claim 10, which is arranged such that the saw blade is re-orientable with respect to the main body by being turned through 180° about its longitudinal axis.
12. A saw according to Claim 10 or Claim 11, in which the saw blade comprises two cutting edges, provided on opposite edges of the saw blade.

13. A saw according to any preceding claim, further comprising a guard extending substantially perpendicular to the cutting edge of the saw blade at the front end of the main body.
14. A saw according to Claim 13 when dependent upon Claim 4 or Claim 5, in which the guard extends generally adjacent to the second handle to protect the user's hand while holding the second handle during use of the saw in reciprocating saw mode.
15. A saw according to any preceding claim, in which the main body is formed from a plastics material.
16. A saw according to Claim 4 or Claim 5 or any claim dependent thereon, in which the main body contains an electric motor located generally between the first and second handles.
17. A saw according to any preceding claim, which is a cordless saw and is provided with its own power source.
18. A saw according to Claim 17, in which the power source is removable from the main body by means of trigger.
19. A saw according to Claim 7 or any claim dependent thereon, further comprising a safety button which needs to be depressed before the actuation control means can actuate the saw.
20. A saw substantially as hereinbefore described with reference to the accompanying figures.
21. A saw substantially as illustrated in the accompanying figures.





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Application No: GB 0124208.0
Claims searched: 1 to 21

Examiner: Gareth Prothero
Date of search: 6 January 2003

Patents Act 1977 : Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1 to 19	EP 1010497 A1 (BLACK & DECKER) See whole document.
X	1 to 3, 7 to 9, 13 & 15 to 19	The Axminster Power Tool Centre Tool Catalogue, 1996-1997, pages 216 to 217.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^v:

B5L

Worldwide search of patent documents classified in the following areas of the IPC⁷:

B23D; B25F

The following online and other databases have been used in the preparation of this search report:

Online: WPI, EPODOC, JAPIO